

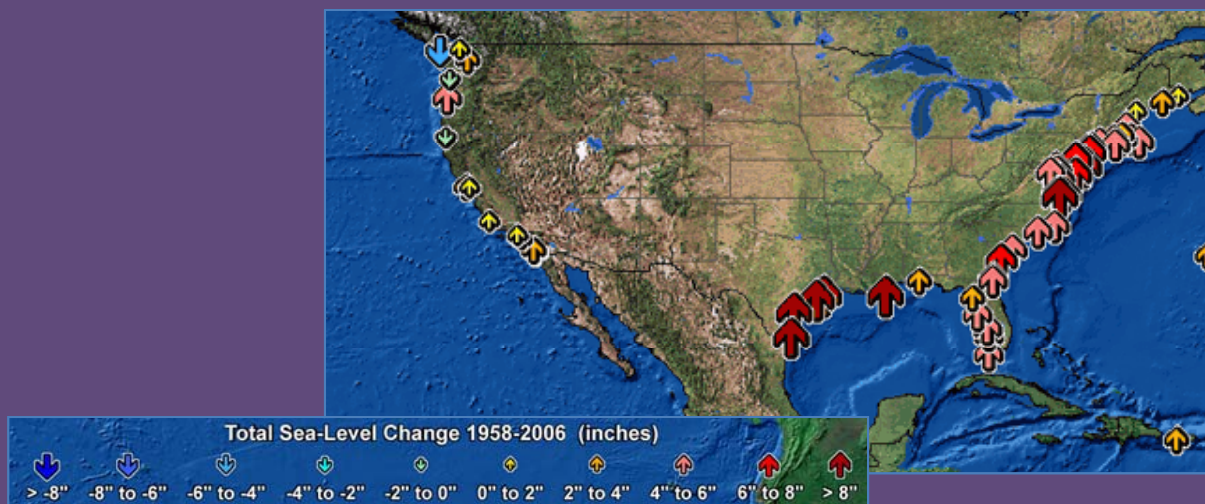
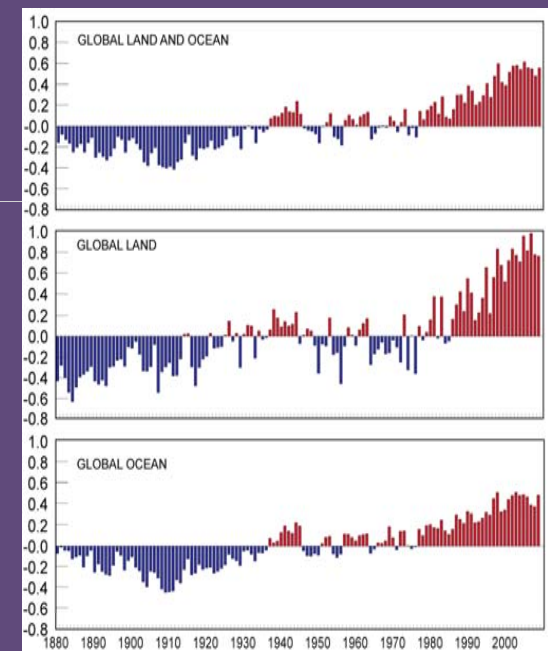
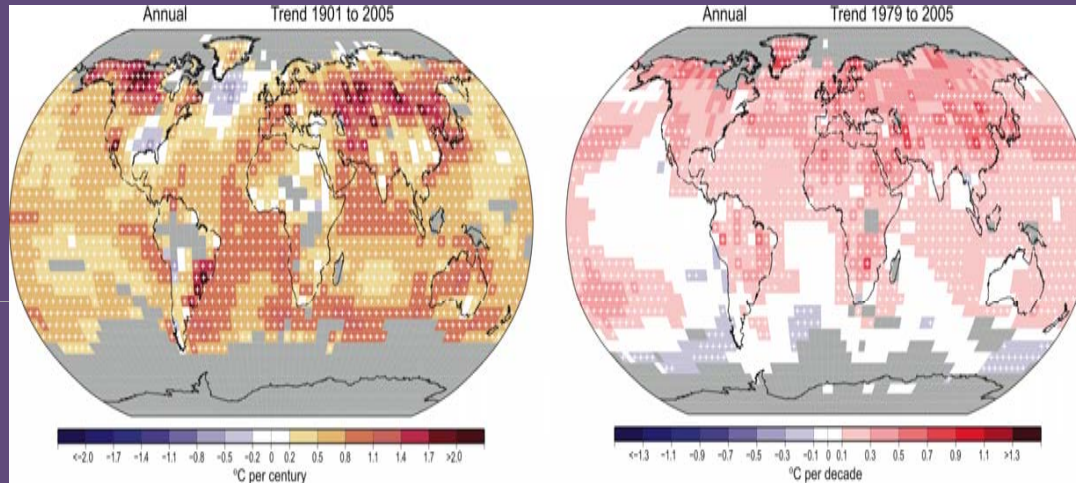


# CLIMATE CHANGE

AT THE DEPARTMENT OF WATER RESOURCES

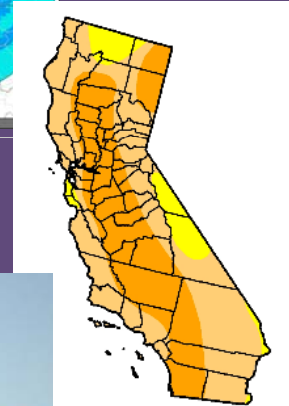
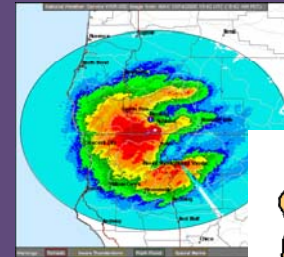


# Climate Science



# In the Next 40 years....

- 3.5 – 11° F temp rise
- 25 – 40 % less snowpack
- More intense wet and dry periods
- Higher flood peaks
- Less summer runoff
- Sea Level rise: 4–16" (7–55" by end of century)
- Increased salinity in the Delta





# Water Sector Impacts to California

California Water Plan Update 2009

## Climate Change: *Stressing Our Water Systems*

### What are the Expected Impacts from These Changes?

Climate change is already having a profound effect on California's water resources as evidenced by changes in snowpack, river flows, and sea levels. Scientific studies show these changes will increase stress on the water system in the future. Because some level of climate change is inevitable, the water system must be adaptable to change.

The impacts of these changes will gradually increase during this century and beyond. California needs to plan for water system modifications that adapt to the following impacts of climate change:

### Water Supply

Changes in river flow impacts water supply, water quality, fisheries, and recreation activities.



A reduction of snowpack will change water supply.



### Ecosystem

Forests, important contributors to water supply and quality, will be more vulnerable to pests, disease, changes in species composition, and fire.



Increases in water temperature and reductions in cold water in upstream reservoirs may hurt spawning and recruitment success of native fishes.



Lower streamflows will tend to concentrate urban and agricultural runoff, creating more water quality problems.



### Water & Power Operations

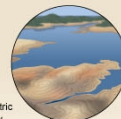
Operation of the water system for urban, agricultural, and environmental water supply and for flood management will become increasingly difficult because of the decisions and trade offs that must be made.



California's hydroelectric power generation may be less reliable; at the same time, higher air temperatures may increase energy consumption through increased use of air conditioning.



Water supply reliability will be compromised.

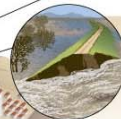


Warmer temperatures will affect water demands.



### Flooding & Drought

Increased flooding potentially causes more damage to the levee system.



Higher temperatures and changes in precipitation will lead to droughts.



### Coast & Delta

Higher water temperatures will make the Delta intolerable to some native species and also more attractive to some non-native invaders that may compete with natives.



Increased salinity in the Delta will degrade drinking and agricultural water quality and alter ecosystem conditions.



Sea level rise threatens coastal communities and infrastructure, in particular, the water system in the Sacramento-San Joaquin Delta where the existing Delta levees were not designed or constructed to withstand these higher water levels.



# Regional Strategies

## Integrated Regional Water Management (IRWM)

- Project Solicitation Packages (PSP's) incorporate climate change
- Grant program Guidelines address both adaptation and mitigation
- Climate Change Clearinghouse and Handbook

*Tertiary treatment  
at Desert Water  
Agency*



# Statewide Strategies

- Greater flexibility in meeting competing objectives
- Flood management that accounts for higher variability
- Emphasize environmental stewardship
- Central Valley Flood Protection Plan (2012) to address climate change impacts



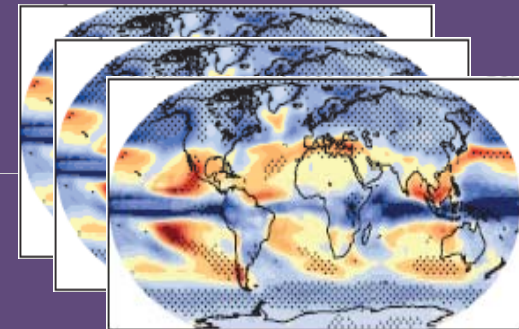
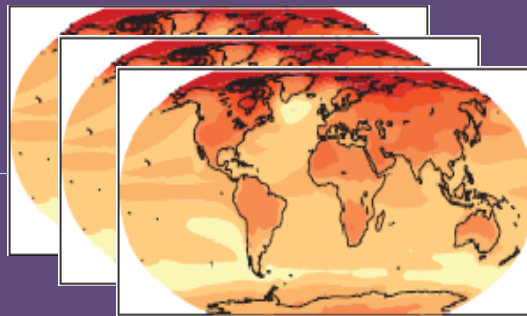
*Jones Tract levee  
break, June 2004*

# CWP 2009 Climate Change

Temperature Projections

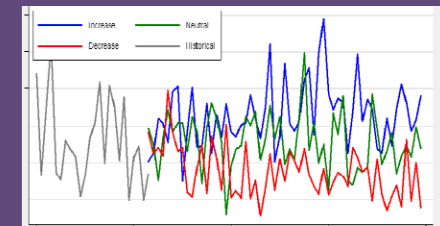
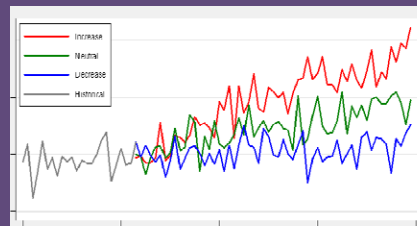
Precipitation Projections

Global Circulation Models



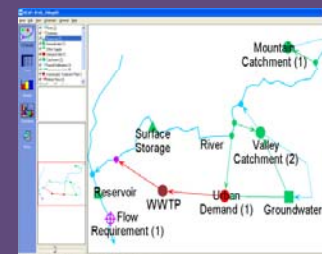
Local time series of monthly weather

Downscaled Local Weather



Hydrologic Model

Irrigation Demand and Hydrologic Flows



# CWP 2013

## Climate Change

- REGIONAL FORUMS

- Full time DWR Climate Change Staff supporting multiple DWR CC efforts
- Scientifically sound approach to address CC regionally in CA

- TECHNICAL EXPERTISE

- CCTAG – Climate Change Technical Advisory Group
- SWAN – Statewide Water Analysis Network